**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Ordinary Level**

# MARK SCHEME for the October/November 2013 series

## 5054 PHYSICS

**5054/42** Paper 4 (Alternative to Practical), maximum raw mark 30

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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**1 (a) (i)** measuring force just before it jumps
reading meter and pulling magnet at same time
force varies/not constant B1 [1]

**(ii)** sensible suggestion, e.g.
use of two people explained
pull slowly
repeat
video newton meter B1 [1]

**(b)** 5.5 ± 0.1 N unit required B1 [1]

**(c) (i)** axes: correct way round, labelled quantity and unit (on *y*-axis only) B1

scales: linear, not awkward
*x*-axis: e.g. 2 cm ≡ 1 *y*-axis: e.g. 2 cm ≡ 1 N B1

points plotted accurately within ½ small square
neat crosses or small points (in circle) B1

smooth curve of best fit drawn B1 [4]

**(ii)** increasing *n* decreases *F*
inverse relationship B1 [1]

**(d)** newton meter not sensitive enough
scale too big
no change/same reading
reading/force is too small (for this meter)/no force B1 [1]

**(e) (i)** new paper/second expt (thicker) as force smaller (or reverse argument)
paper that gives 3.0 N force B1 [1]

**(ii)** more sensitive
more readings
larger values for *F* B1 [1]

**(f) yes +** aluminium non-magnetic B1 [1]

**2 (a)** diagram showing paper and plain mirror
**plus** incident and reflected rays **OR** four roughly correct pins B1

2 pins placed on incident ray B1

pins or image (of pins) viewed in/through mirror B1

lines drawn **and** angles *i* and *r* **measured** to normal B1 [4]

**(b)** sensible suggestion, e.g.
view bottom of pins
pins vertical
pins far apart, e.g. greater than 5 cm
repeat for different angles/repeat experiment
sharp pencil B1 [1]

**3** **(a)** **(i)** 0.9 V cao (unit required) B1 [1]

**(ii)** crocodile clips
tight connections explained, e.g. wrap wire and tape B1 [1]

**(iii)** same value/0.9 V and needle to right B1 [1]

**(b)** sensible suggestion, e.g.
e.m.f./voltage too small
run down quickly/small amount of energy
voltage not steady
current too small
resistance too large B1 [1]

**(c)** **(i)** **1.** 2.7 (V) ecf 3 × **(a)(i)** B1 [1]
**2.** correct wiring in series **and** connected to voltmeter B1 [1]

**(ii)** **1.** 0.9 (V) ecf = **(a)(i)** B1 [1]
**2.** correct wiring in parallel **and** connected to voltmeter B1 [1]

**4** **(a)** measures all ten together and divides by ten B1

how stops marbles moving, e.g.
in a groove
between two rulers
5 or more in a line shown touching each other B1

how ends are marked, e.g.
use of blocks
correct use of set squares B1 [3]

**alternative methods:**
methods of measuring one marble can score **max. 2**

measuring all 10 and averaging (B1)

technique, e.g.
set squares/blocks with one marble
circumference from:
string/paper rolled round marble then ÷ π
ink dot on marble and roll then ÷ π (B1)

**(b)** **(i)** 16.8(0) mm / 1.68(0) cm cao (unit required) B1 [1]

**(ii)** diameter (of same marble) measured more than once in different direction(s) B1 [1]